

Child Growth Monitoring and Promotion Practice and Associated Factors among Health Care Workers at Public Health Institutions in South Wollo Zone, Northeast Ethiopia: An Institution based Cross Sectional Study

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Abstract

Background

Even though Growth Monitoring and Promotion (GMP) has been practicing in many countries including Ethiopia for well children less than two years of age to prevent malnutrition, there is still a chance to acquire malnutrition in Ethiopia. However, there is no study that documented the proportion of GMP practice and associated factors in the study area. Therefore, the aim of this study was to assess GMP practice and identify associated factors among health care workers.

Methods

Institution based cross-sectional study design was employed on 397 randomly selected health care workers in South Wollo Zone, northeast Ethiopia from May 25 to July 7, 2020. Pre-tested self-administered questionnaire and in-depth interview were used to collect data. Quantitative data were analyzed using SPSS version 20.0 software. Thematic analysis was applied to the qualitative part. Bivariable and multivariable logistic regressions were used to identify associated factors with GMP practice. Statistical tests at P-value < 0.05 with 95% confidence interval were taken for statistical significance.

Results

The proportion of GMP practice among health care workers was 58.4% with (95% CI: 54.0–63.0). First degree (AOR = 2.25; 95% CI: 1.005, 5.05), diploma (AOR = 3.52; 95% CI: 2.04, 6.09), work experience on GMP (AOR = 3.13; 95% CI: 1.58, 6.20), GMP training (AOR = 4.83; 95% CI: 2.89, 8.06), GMP equipment (AOR = 2.75; 95% CI: 1.64, 4.58) and attitude towards GMP (AOR = 3.70; 95% CI: 2.228, 6.174) were factors significantly associated with GMP practice.

Conclusions

The proportion of GMP practice among health care workers was 58.4%. Educational level, work experience on GMP, GMP training, GMP equipment and attitude towards GMP were positively associated with GMP practice. Therefore, Ministry of Health should strengthen availability of GMP equipment, GMP training, and bring positive attitude towards GMP to improve GMP practice with special focus on health care workers with lower experience on GMP service.

Background

Growth Monitoring and Promotion (GMP) is a preventive and promotive activity comprised of growth monitoring (GM) linked with promotion (P) usually counseling on child feeding and health. It focuses on

following up the growth rate of well- children under two years of age in comparison with standard by periodic, frequent anthropometric measurement of weight and plotting it on the weight-for-age growth chart which enables health care workers to see the changes in the children weight and giving counseling to mothers/caregivers about their children growth (1, 2).

The promotional activity relies on the growth pattern of the children. It is used by the health care workers to determine appropriate actions to promote children growth. These actions include counseling mothers/caregivers about their children growth according to their needs and growth pattern (3). That is why the term promotion was added to growth monitoring to emphasize the action components of GMP activity. GMP, therefore, in one hand, helps in combating children malnutrition through timely and early detection of growth faltering (1). In other hand, it helps to reduce children mortality whereby it boosts the achievement of the sustainable development goal 3 (SDG3) (4).

To enhance normal growth and health of children less than two years of age, the improvement of GMP practice of health care workers is crucial (5). As several studies indicated since 1980s, GMP was promoted as one of the key components of community nutrition programmes worldwide for decades (3, 6). What is more, a survey on child GMP practices worldwide showed that wide implementation of this routine practice in Asia, Europe, Latin America, and Africa (7). Moreover the survey also confirm that in areas where GMP was implemented as part of a package of nutrition and health programs, positive impacts on child growth outcomes have been reported (7).

In Ethiopia similarly, many programmes have been launched to address the issue of persistent malnutrition. Among them GMP is the most effective intervention and it forms the basis of comprehensive children care. It is emerged as one of the components of Ethiopia National Nutrition Strategy (NNS) and National Nutrition Programme (NNP II) and it has been implementing through the health institutions at various levels and largely integrated with the health extension package (8, 9). Health care workers particularly health extension workers are the first accountable for GMP service practicality. One of their tasks is to provide GMP service through “Triple-A” approach” (Assessment, Analysis and Action) (6).

Even though GMP has been practiced for the past 40 years in many countries including Ethiopia for millions of children to prevent malnutrition, its practice has been fraught with problems. Its effectiveness has been questioned mostly due to problems in implementation including low coverage and poor linkage of growth monitoring to promotion activities (1). What is more as reported in study conducted in Switzerland, problems encountered by health care workers includes inadequate interpretation of the growth curve (48%), inaccurate plotting of measurements of weight on the growth chart (40%), and poor understanding of growth reference curves (29%) (7). Another problem of the health care workers in implementing GMP service is, inconsistency in performing GMP procedures which leads them to faulty interpretation of children’s growth patterns which in turn resulting in inaccurate information being forwarded to policy makers (10).

Evidence suggest that implementing growth monitoring without linking to promotion is a waste of resources and a loss of opportunities (11). Health care workers mainly gave emphasis on weighing of the children weight in the absence of giving counseling for mothers/caregivers on children feeding based on the growth curve (12). Moreover, studies conducted on GMP practice reported that counseling offered to mothers/caregivers during GMP service is weak (3, 13). A study conducted in Tigray Region, Ethiopia shown that only 16.8% of the health care workers offered counseling to mothers/caregivers based on the child growth curve (14).

Pertaining to GMP coverage and practice, the United Nations International Children’s Emergency Fund (UNICEF) recommends that a 100% GMP coverage and practice present a brighter future for children; nonetheless, there is a discrepancy between the purpose and actual practices of GMP. The high prevalence of malnutrition in many developing countries seems to confirm this fact (1, 15, 16)

Studies conducted in Amhara and Tigray Region, Ethiopia revealed that the proportion of GMP practice of health care workers were 50.4% and 53.6% respectively (14, 17). Previous research studies conducted in the country identified factors affecting GMP practice. Attitude, training, workload, supportive supervision, availability of GMP equipment, work experience, qualification and educational level were associated with GMP practice (18, 21).

The first two years of a child’s life are extremely important. These years, have been described as a critical window of opportunity for ensuring appropriate children growth through optimal feeding (20). Growth monitoring and promotion if not practiced appropriately in the first two years can make the children more prone to malnutrition (21). In Ethiopia, though GMP has been implementing since 2008, its practice is not as effective as expected. A study conducted in Amhara and Tigray Region pointed out that GMP practice is suboptimal. There is still a chance to acquire child malnutrition and its prevalence is high among children (14, 17).

The 2019 Ethiopia Demography and Health Survey (EDHS) shown about 37%, 7% and 21% of children under five were stunted, wasted and underweight respectively. Malnutrition increase death and illness, decrease productivity and bring poor educational performance. Thus, these impede social and economic development (22).This indicate that the factors associated with GMP practice still need due attention to be researched so as to improve GMP practice of health care workers. However, the status of GMP practice and associated factors were not studied in South Wollo Zone, northeast Ethiopia.

This study was therefore conducted to assess child GMP Practices and identify associated factors among health care workers at public health institutions in South Wollo Zone, northeast Ethiopia. The finding of this study may be used for policy makers, program planner and implementers in planning appropriate intervention on GMP program targeting children less than two years of age.

Methods

Study Design, Setting and Period

A health institution based cross-sectional study design with both quantitative and qualitative data collection methods was conducted at public health institutions in south wollo zone, Amhara Region, Ethiopia from May 25 to July 7, 2020. South Wollo Zone has twenty-two districts. According to Central Statistical Agency (CSA) census of Ethiopia conducted in 2007 the estimated population of the zone is 2,518,862. Of these 1,248,698 were males and 1,270,164 were females (23). The health institutions had trained staff on growth monitoring and promotion. Growth monitoring and promotion service is provided by health care workers for children less than two years at the health center integrated with health post according to the information obtained from the South Wollo Zone Health Department.

Source Population, Study Population and Eligibility Criteria

The source populations were all health care workers who have been providing GMP service to children less than two years of age in all public health institutions in South Wollo Zone. The study populations were all health care workers who have been providing GMP service for one year and above to children less than two years of age in the selected public health institutions in South Wollo Zone. Only those who were willing to be part of the study and signed the written consent form were included in the study. Also, those who had current illness, less than one year work experience on child GMP service and those who were in leave excluded from the study.

Sample Size Determination and Sampling Procedures

The sample size for quantitative study was calculated using Epi Info version 7 by considering 95% confidence level based on standard normal distribution, 5% margin of error and the estimated proportion of GMP practice at public health institutions in North Gonder Zone, Amhara Region, Ethiopia is 50.4% (17). Thus, adding 10% non-response rate, the total number of study participants were 422.

There are 129 governmental health centers and 496 health posts that have GMP services in South Wollo Zone. Of these, 39 public health institutions (20 health centers and 19 health posts) were randomly selected and included in the study based on provision of GMP service for well-children under two years age. The sample was allocated proportionally to the size of health centers and health posts. To sample respondents from the study population the list of health care workers in the selected health institutions obtained from the Woreda health office was used as the sampling frame of the study.

After proportional reallocation was employed based on the desired number of health care workers for each selected 39 health institutions, total sample sizes of 422 health care workers were selected for the quantitative study using simple random sampling method through random number generation tables. Five interviewees were included in the quantitative study were purposively selected based on their duration of more service years in providing GMP service for well-children less than two years of age.

Study Variables

The dependent variable of the study was child Growth Monitoring and Promotion practice. The independent variables of the study were socio demographic and economic factors (age, sex, educational and marital status, qualification, length of work experience, monthly income, place of work and place of

residence), supportive supervision (feedback, report writing, and update the new procedures), training on GMP, work load, logistics and supply (GMP equipment, stationary materials, growth charts, GMPs' counseling cards.), knowledge and attitude on GMP practice.

Operational Definition

Level of GMP Practice - Respondents who scored at least 75% of the nine GMP practice questions were labeled to have "Good GMP practice" and those who scored less than 75% of the nine GMP practice questions were labeled to have " Poor GMP practice." (17).

Level of Attitude towards GMP practice - Respondents who scored at least 75% of the eleven attitude questions were labeled to have "Positive attitude" towards GMP practice and those who scored less than 75% of the eleven attitude questions were labeled to have "Negative attitude" towards GMP practice (17).

Level of Knowledge on GMP practice - Respondents who scored at least 75% of the eleven knowledge questions were labeled to have "Adequate knowledge" towards GMP practice and those who scored less than 75% were labeled to have "Inadequate knowledge" towards GMP practice (17).

Workload - A health care worker who saw 25 children or more per day was regarded as busy, and less than 25 children per day as ideal during GMP session (24).

Data Collection Procedures

A self- administered pre-tested Amharic version questionnaire that adapted from previously done similar studies was used to collect quantitative data (14, 17).The data were collected by three data collectors, who had experience in collecting data with the support of two supervisors. The questionnaires were distributed by data collectors and self-administered by study participants during the working time. An in-depth interview with semi-structured interview guide was used to collect qualitative data. The interviewees were asked questions, followed by probes until the data saturation was achieved. During interview audio was record to prevent data loss and capture the information.

Data Quality Assurance

To assure the quality of quantitative data, first the English version of the questionnaire was translated into Amharic version. The questionnaire was pre-tested at 5% of the total sample size out of the study area in Dessie city Administration with similar characteristics prior to the actual data collection. Solutions were made for the error and problems identified during the pre-test survey before using the questionnaire for the actual study. One day intensive training was given for data collectors and supervisors on the overall data collection procedures. Each data collector checked the questionnaires for completeness before distributed to each study participant. The supervisors were made a day to day on site supervision during the period of data collection. The filled questionnaires were checked for completeness daily by supervisors on the spot. Principal investigator controls the overall data collection process on site for the nearby health institutions and with cell phone for long distance health institutions.

To assure the quality of qualitative data, semi-structured questionnaire was prepared first in English version and then translated into Amharic version. The audio recorded and note taken data obtained from in-depth interviews were verbatim transcribed and translated. The transcription was done as soon as possible after the in-depth interviews were conducted, to decrease the risk of transcription errors.

Data Processing and Analysis

The collected quantitative data were checked for completeness and coded before data entry and entered into Epi data version 3.1 by principal investigator. For the statistical analysis, the data were transferred to SPSS version 20. For GMP practice questions, each yes response was given score of 1 point and no response was given score of 0 point. The attitude questions were measured with five point Likert Scale ranging from 1 (strongly disagree) to 5 (strongly agree). Reverse coding was made for negatively framed attitude questions. Moreover, recoding the scale as disagree and agree was made. Then each positive response (agree) were given score of 1 point and each negative response (disagree) were given score of 0. For knowledge questions, each correct answer was given score 1 and incorrect answering 0. Finally the sum was computed to each respondent for practice, attitude and knowledge questions.

Descriptive statistics were computed and the result was reported using frequency and percentage. Next bivariable logistic regression analyses were performed for the determination of the association between the outcome variable (GMP practice) and various potential associated factors as independent variables. All independent variables with a P-value of less than 0.25 in the bivariable logistic regression analyses were selected as candidate variables for the multivariable analyses. Subsequently, multivariable logistic regression analyses with a Backward Stepwise (Likelihood Ratio) method was performed for controlling the possible effect of confounders and to identify the independent variables that shown significant association with the outcome variable (GMP practice).

Finally, variables with the p-value less than 0.05 and adjusted odds ratio (AOR) of 95% confident interval (CI) in the multivariable logistic regression model were taken as statistically significant. To evaluate the association between GMP practice and each independent variable, both crude odds ratio (COR) and adjusted odds ratio (AOR) with 95% confidence interval were reported. The model goodness of the test was checked by Hosmer–Lemeshow goodness of the fit and the p-value of the model fitness of the test was 0.28. Multicollinearity was checked by using variance inflation factors and all variables have a variance of < 3.

Thematic analysis was used to summarize qualitative data from in-depth interview. To add an in-depth of information on GMP practice that could not be captured by quantitative methods alone, data captured using records and note taken during the interview was transcribed and translated word by word into English language and then coded and categorized in to different four main thematic areas based on similarity in concepts and presented the result by extracted concepts from main themes.

Ethical Considerations

Ethical clearance, reviewed and approval letter to conduct the study was obtained from Ethical Review Committee of College of Medicine and Health Sciences, Wollo University. Official letter of cooperation was written to South Wollo Zone Health Department. Permission to conduct the study was obtained from the South Wollo Zone Health Department and District health offices. Prior to administer the questionnaires, the objective of study was explained to the study participants. Written informed consent was obtained from each study participant included in the study before data collection. Study Participants were noticed as they have the right not to participate in the study. They were informed as they were not harmed by the process and outcome of the study. All the information was kept confidential.

Results

Socio demographic and Economic Characteristics of Health Care Workers

A total of 422 health care workers were targeted but 397 health care workers participated in the study with the response rate of 94.1%. All 397 health care workers who participated in the study were females. Of these 340 (85.6%) were health extension workers. More than one-third 153 (38.5%) of respondent's age were between 25–29 year. Among the respondents, 208 (52.4%) lived in urban area. More than half 220 (55.4%) of respondents had diploma. Regarding marital status, the majority 245 (61.7%) of respondents were married. A higher proportion 358 (90.2%) of the respondents were from Amhara ethnic group. Nearly half 197 (49.6%) of the respondents were Orthodox Christians followed by those who were Muslim 184 (46.3%). In terms of work place, most 342 (86.1%) of respondents had been providing child GMP service in the health post. More than three quarter 317 (79.8%) of respondents had between one and ten years of working experience. More than half 235 (59.2%) of the respondents belonged to monthly income of greater than and equal to 3500 ETB. (Table 1).

Table 1

Socio demographic and Economic characteristics of health care workers in South Wollo Zone, northeast Ethiopia from May 25 to July 7, 2020

Variables	Frequency	Percent
Sex		
Female	397	100%
Age groups		
20–24	79	19.9
25–29	153	38.5
30–34	88	22.2
≥ 35	77	19.4
Place of residence		
Urban	208	52.4
Rural	189	47.6
Marital status		
Married	245	61.7
Currently unmarried	152	38.3*
Qualification		
Nurse	57	14.4
Health extension worker	340	85.6
Educational level		
Certificate	128	32.2
Diploma	220	55.4
First degree	49	12.3
Religion		
Muslim	184	46.3
Orthodox	197	49.6
Catholic	6	1.5
Protestant	10	2.5

* Currently unmarried includes single, divorced, separated and widowed, ETB = Ethiopian Birr

Variables	Frequency	Percent
Ethnicity		
Amhara	358	90.2
Oromo	36	9.1
Tigre	3	0.8
Work place		
Health center	55	13.9
Health post	342	86.1
Work experience		
1–10	317	79.8
≥ 11	80	20.2
Income per month (ETB)		
1500–2499	13	3.3
2500–3499	149	37.5
≥ 3500	235	59.2
* Currently unmarried includes single, divorced, separated and widowed, ETB = Ethiopian Birr		

Availability of GMP equipment, Training and Supportive supervision

Nearly two third 255 (64.2%) of respondents reported that they have GMP equipment in their health institutions. Less than two thirds 235 (59.2%) of respondents indicated that they attended GMP training. The most common training received by respondents were on weigh skill 224 (40.1%), on plotting technique of growth chart 219 (39.2%) and on child feeding counseling 116 (20.8%). More than three-quarter 231 (78.0%) of the training were provided by District Health Office and less than half 185 (46.6%) of the training taken by the respondents with the range of 1–10 times. Nearly half 209 (52.6%) of the respondents had got supportive supervision and nearly three quarters 198 (77.3%) of the supportive supervision were provided by District supervisor (Table 2).

Table 2

Availability of GMP equipment, training and supportive supervision for health care workers in South Wollo Zone, northeast Ethiopia from May 25 to July 7, 2020

Variables		Frequency	Percent
Availability of equipment to do GMP			
Yes		255	64.2
No		142	35.8
Training attended by HCW on child GMP			
Yes		235	59.2
No		162	40.8
Training attended			
on weigh skill*	Yes	224	40.1%
on plotting technique *	Yes	219	39.2%
on child feeding counseling*	Yes	116	20.8%
Training provided			
by District health office*	Yes	231	78.0%
by NGO*	Yes	65	22.0%
Number of training taken by HCWs			
1-10		185	46.6
≥ 11		50	12.6
Supportive supervision on child GMP			
Yes		209	52.6
No		188	47.4
Supportive supervision			
by District supervisory *	Yes	198	77.3%
by NGO*	Yes	58	22.7%
*Multiple responses, GMP = Growth Monitoring and Promotion, HCW = Health Care Worker, NGO = Non-Governmental Organization			

Workload

Half 201 (50.6%) of the respondents reported that they have seen less than 25 children during GMP session per day. A response's of more than half 222 (55.9%) respondents indicated that they took an average of one to ten minutes for one child to assess GMP. Nearly three quarters 309 (77.8%) of the respondents have had another work in addition to GMP (Table 3).

Table 3
Workload for health care workers in South Wollo Zone, northeast Ethiopia from May 25 to July 7, 2020

Variables	Frequency	Percent
Number of children seen during GMP session per day		
< 25	201	50.6
≥ 25	196	49.4
Average time in minute to assess GMP for one child		
1–10	222	55.9
≥ 11	175	44.1
Another work in addition to GMP		
Yes	309	77.8
No	88	22.2
GMP = Growth Monitoring and promotion		

Knowledge of Health Care Workers on GMP Practice

A large percentage 322 (81.1%) of the respondents knew the purpose of GMP. Most of the respondents 365 (91.9%) knew that the benefit of Growth chart. Three hundred thirty one (83.4%) of respondents knew that children between 0–2 years should be weighed every month. Most 361 (90.9%) of respondents understood that the meaning of a plotted line rising on the growth chart. Regarding the meaning of a plotted line falling on the growth chart 354 (89.2%) of respondents knew the meaning. More than half 229 (57.7%) of respondents knew the indication of a plotted line that deviates upwards above the upper limit of the normal as excess gain of weight. The down ward deviation of the plotted line below the lower limit of the normal understood by almost three quarters 295 (74.3%) of respondents as inadequate weight gain. Three quarters 298 (75.1%) of the respondents knew why is it important to give foods in addition to breast milk to babies from the age of six months. Two -thirds 265 (66.8%) and 233 (58.7%) of the respondents knew recommended daily feeding frequency for 6–8 month old breastfeeding children and for 9–23 month old breastfeeding children respectively. But for the non-breastfeeding 6–23 month old children only 160 (40.3%) of the respondents knew the recommended daily feeding frequency. At end, the computed overall knowledge score indicate that only 328 (82.6%) of the respondents had adequate knowledge about GMP services (Table 4).

Table 4
Knowledge of health care workers towards GMP practice in South Wollo Zone, northeast Ethiopia from
May 25 to July 7, 2020

Variables	Frequency	Percent
Purpose of GMP		
Know	322	81.1
Don't know	75	18.9
Benefit of Growth chart		
Know	365	91.9
Don't know	32	8.1
Frequency of weighing schedule for children aged group 0–2 years		
Know	331	83.4
Don't know	66	16.6
Meaning of a plotted line rising on the growth chart		
Know	361	90.9
Don't know	36	9.1
Meaning of a plotted line falling on the growth chart		
Know	354	89.2
Don't know	43	10.8
Indication of deviations of plotted line above the upper reference curve		
Know	229	57.7
Don't know	168	42.3
Indication of deviations of plotted line below the lower reference curve		
Know	295	74.3
Don't know	102	25.7
Reason for giving complementary foods at six months of age		
Know	298	75.1
Don't know	99	24.9
Recommended daily feeding frequency for 6–8 month old breastfeeding child		
GMP = Growth Monitoring and promotion		

Variables	Frequency	Percent
Know	265	66.8
Don't know	132	33.2
Recommended minimum daily feeding frequency for 9–23 month old breastfeeding child		
Know	233	58.7
Don't know	164	41.3
Recommended daily feeding frequency for 6 – 23 month old non breastfeeding child		
Know	160	40.3
Don't know	237	59.7
Knowledge Status		
Adequate knowledge	328	82.6
Inadequate knowledge	69	17.4
GMP = Growth Monitoring and promotion		

Attitudes of Health Care Workers towards GMP Practice

More than two-thirds 283 (71.3%) of respondents believed that GMP is important for well-being of every children and nearly three quarter 294 (74.1%) of the respondents believed that GMP is effective to prevent malnutrition. Of the 397 respondents, 292 (73.6%) of respondents believed that regular monthly weighing of weight is important. However, 346 (87.2%) of the respondents considered the process of child GMP is time consuming and similarly, more than three-quarter 322 (81.1%) of the respondents considered the process of GMP is burdensome. Nearly three quarters 313 (78.8%) and 338 (85.1%) of the respondents disagree that weighing the weight did not make them happy and the process of GMP is inconvenient respectively. Three hundred eight (77.6%) of the respondents believed that mothers/caregivers should be involved in child GMP sessions and three quarter 263 (66.2%) of the respondents agree that counseling of mothers/caregivers makes GMP complete. About 284 (71.5%) of the respondents believed that the trainings had been enhance health care workers to conduct GMP effectively and 276 (69.5%) of the respondents agree that supportive supervision for health care workers is important for GMP practice. In general, when an overall attitude score was computed, 249 (62.7%) of the respondents had positive attitude towards GMP service (Table 5).

Table 5
Health care workers attitude towards GMP practice in South Wollo Zone, northeast
Ethiopia from May 25 to July 7, 2020

Variables	Frequency	Percent
GMP is necessary for the well-being of every children		
Agree	283	71.3
Disagree	114	28.5
Regular monthly weighing of child weight is important		
Agree	292	73.6
Disagree	105	26.4
Weighing of the child weight make you happy		
Agree	84	21.2
Disagree	313	78.8
The process of child GMP is time consuming		
Agree	346	87.2
Disagree	51	12.8
The process of child GMP is convenient		
Agree	59	14.9
Disagree	338	85.1
Child GMP is effective in preventing childhood malnutrition		
Agree	294	74.1
Disagree	103	25.9
Mothers/caregivers should be involved in child GMP sessions		
Agree	308	77.6
Disagree	89	22.4
Process of child GMP is burdensome.		
Agree	322	81.1
Disagree	75	18.9
Counseling of mothers/caregivers makes child GMP complete		

GMP = Growth Monitoring and Promotion, HCW = Health Care Worker

Variables	Frequency	Percent
Agree	263	66.2
Disagree	134	33.8
Training enhances HCW ability to do child GMP effectively		
Agree	284	71.5
Disagree	113	28.5
Supportive supervision important for child GMP practice		
Agree	276	69.5
Disagree	121	30.5
Attitude Status		
positive attitude	249	62.7
Negative attitude	148	37.3
GMP = Growth Monitoring and Promotion, HCW = Health Care Worker		

Health Care Workers GMP practice

Almost all 396 (99.7%) of the respondents weighed the child weight monthly while doing GMP in their health institution. Most of 350 (88.2%) of the respondents would undress/light dress the child before weighing of the child weight for accurate weight. Almost half 196 (49.4%) of the respondents would check the accuracy of the weight scale and more than half 248 (62.5%) of the respondents adjusted the weigh scale to zero with empty plastic washing bowl before weighing of the child weight. Nearly two-thirds 268 (67.5) of the respondents plotted the growth curve on growth chart while doing GMP and more than half 225 (56.7) and almost half 202 (50.9%) of the respondents were also able to interpret the growth curve and explain it to mothers/caregivers while doing GMP respectively. Less than half 167 (42.1%) of the respondents counseled mothers/caregivers based on the growth curve when carrying out GMP. Almost all 382 (96.2%) of the respondents advised mothers/caregivers to introduce only breast milk for six months and solid, semi-solid or soft foods at six months for their child in addition to breast milk. Although 328 (82.6%) respondents had adequate knowledge and 249 (62.7%) of the respondents had positive attitude towards GMP, the overall proportion of GMP practice among health care workers was 58.4% (95% CI: 54.0–63.0) (Table 6).

Table 6

Health care workers GMP Practice in South Wollo Zone, northeast Ethiopia from May 25 to July 7, 2020

Variables	Frequency	Percent
Weigh the child weight while doing growth monitoring and promotion		
Yes	396	99.7%
No	1	0.3
Check the accuracy of the weight scale while doing GMP		
Yes	196	49.4
No	201	50.6
Undress/ light dress the child while weighing the child weight		
Yes	350	88.2
No	47	11.8
Adjust the weight scale to zero with plastic washing bowl before weighing the child weight		
Yes	248	62.5
No	149	37.5
Explain growth curve to mothers/caregiver while doing GMP		
Yes	202	50.9
No	195	49.1
Plot the growth curve on growth chart while doing GMP		
Yes	268	67.5
No	129	32.5
Interpret the growth curve while doing GMP practice		
Yes	225	56.7
No	172	43.3
Counsel mothers/caregivers based on the growth curve when carrying out GMP		
Yes	167	42.1
No	230	57.9

GMP = Growth Monitoring and promotion

Variables	Frequency	Percent
Counsel mothers/caregivers when to introduce breast milk and solid, semi-solid for their child		
Yes	382	96.2
No	15	3.8
Practice status		
Good GMP practice	232	58.4
Poor GMP practice	165	41.6
GMP = Growth Monitoring and promotion		

Factors Associated with GMP Practice of Health Care Workers

The result of multivariable logistic regression analysis, Education level of health care workers (being diploma and first degree), length of work experience on GMP, GMP training, availability of GMP equipment and attitude of health care workers towards GMP were significantly associated with GMP practice. After adjusting for other variables, the results shown that the odds of GMP practice among first degree health care workers were two times higher as compared to the odds of GMP practice among certificate health care workers (AOR = 2.25; 95% CI: 1.005, 5.05). The odds of GMP practice among diploma health care workers were almost four times higher as compared to the odds of GMP practice among certificate health care workers (AOR = 3.52; 95% CI: 2.04, 6.09). The odds of GMP practice among HCWs who had work experience ≥ 11 years were three times higher as compared to the odds of GMP practice among health care workers who had work experience 1–10 years (AOR = 3.13; 95% CI: 1.58,6.20).

The odds of GMP practice of the health care workers who have got training on GMP were five times higher as compared to the odds of GMP practice of the health care workers who did not get training on GMP (AOR = 4.83; 95% CI: 2.89, 8.06). The odds of GMP practice among health care workers who had GMP equipment were found almost three times as compared to the odds of GMP practice of health care workers who had not GMP equipment (AOR = 2.75; 95% CI: 1.64, 4.58). The odds of GMP practice among health care workers who had positive attitude towards GMP were four times higher as compared to the odds of GMP practice among health care workers who had negative attitude towards GMP (AOR = 3.70; 95% CI: 2.228, 6.174) (Table 7).

Table 7

Factors associated with GMP practice among health care workers in South Wollo Zone, northeast Ethiopia from May 25 to July 7, 2020

Variables	GMP Practice		COR (95% CI)	AOR (95% CI)	P-value
	Good	Poor			
Education level					
First degree	31	18	2.777(1.405–5.489)	2.255(1.005–5.059)	.049*
Diploma	152	68	3.604(2.282–5.691)	3.529(2.044–6.093)	.0001*
Certificate	49	79	1	1	
Work experience on GMP					
≥ 11	62	18	2.978(1.686–5.263)	3.134(1.584–6.202)	.001*
1–10	170	147	1	1	
Training attended on GMP					
Yes	177	58	5.937(3.823–9.219)	4.831(2.894–8.065)	.0001*
No	55	107	1	1	
Supportive Supervision on GMP					
Yes	155	54	4.138(2.706–6.328)	1.428(.813 – 2.510)	.215
No	77	111	1	1	
Availability of GMP equipment					
Yes	154	101	3.280(2.163–4.974)	2.751(1.648–4.589)	.0001*
No	78	64	1	1	
Attitude on GMP					
Positive	175	74	3.775(2.460–5.794)	3.709(2.228–6.174)	.0001*
Negative	57	91	1	1	

*Significant at p-value < 0.05, GMP = Growth Monitoring and Promotion, COR = Crude odds ratio, AOR = Adjusted odds ratio

Interview

An in-depth interview was carried out with a total of five interviewees who provided GMP service in their health institution for children under-two years of age. They have eight and above years' work experience on providing child GMP service. The main themes that emerged from interviews with health care workers related to the child feeding counseling, attitude towards GMP, training on GMP and resource for GMP. The key findings are organized under different thematic areas and presented below.

Child Feeding Counseling

The majority of the participants who were interviewed said that they offered counseling to mothers/caregivers. During the GMP session they said that they gave more emphasis to infant breastfeeding and complementary feeding. Few said that they were so busy and the counseling time was too short to discuss more with mothers/caregivers as result of this they believed that they were not perform the counseling appropriately.

A 29 years old rural health extension worker with an experience of 9 years on GMP practice said, "...As we do the growth monitoring, there is also child feeding counseling that goes out to the mothers/caregivers. We gave advice to the mothers/caregivers about child breastfeeding and complementary feeding. Regarding breast feeding we told them to provide only breast milk for their child until their children reached six month. We also provided advice on what foods they should give (solid, semisolids, liquid) when the child is above six months in addition to breast milk."

Attitude towards GMP Practice

Most of the interviewed participants believed that Growth Monitoring and Promotion is one among the different important tools used to advance the normal growth of children. They also looked upon it as effective as to reduce malnutrition. Some of the participants pointed out that it is very helpful in providing information on whether a child growing well or not.

A 32 years old urban health extension worker with an experience of 10 years on GMP practice said, "... GMP is a good and important tool, easy to use and effective. It is one of the services that we have to do to reduce child malnutrition."

Training on GMP Practice

One of the interviewed participants reported that training on growth monitoring and promotion service is important. However counseling of mothers/caregivers on child feeding and health is given partially due to lack training on child feeding counseling.

A 29 years old rural health extension worker with an experience of 9 years on GMP practice said "... Even if we have been trained, the training is not adequate. In-service training in growth monitoring and promotions service is important, if there are changes, every time there is a different way of doing things, to keep up the standard and to update the procedures of GMP training is important."

Resource for GMP Practice

More than half of the interviewed participants reported that they are often understaffed. In addition, there are activities which they do in line with GMP, such as immunizations and family planning these altogether result a heavy workload. Regarding equipment/supply almost more than half participants reported that there were lack of equipment and supply like, growth chart, registration books, visual aids and referral formats.

A 35 years old urban nurse with an experience of 11 years on GMP practice said, “... *sometime large number of children that we are seeing during GMP session result in a heavy workload. Because we are understaff. We are in need of more health care workers. If we had more staff, I think it would be better to do GMP.*”

A 30 years old rural health extension worker with an experience of 8 years on GMP practice said, “... *There is lack of GMP equipment and shelter to perform GMP. When we have everything at hand then everything works on GMP well.*”

Discussion

This health institution based cross- sectional study design was employed to assess child growth monitoring and promotion (GMP) practice and associated factors among health care workers who provided GMP service at public health institutions in South Wollo Zone, Amhara Region, Ethiopia.

The finding showed that the overall proportion of good child GMP practice was 58.4% with (95% CI: 54.0–63.0). The finding of this study revealed that the proportion of good child GMP practice was slightly higher than reports from North Gonder Zone, Amhara Region (50.4%) (17) and Tigray region, Ethiopia (53.6%) (14). The possible reason for this variation might be the difference in the study setting. This may also be attributed to the time difference as there could be current improvement in accessing and practicing GMP service through time and other factors could be attributed to place variation between this and previous studies.

In view of addressing the second objective, an attempt was made to examine the associations between dependent variables and the independent variable. Multivariable logistic regression analysis was used to identify factors associated with GMP practice of health care workers. The model identified educational level of health care workers, work experience on GMP practice, training on GMP practice, availability of GMP equipment and attitude of health care workers towards GMP having statistical significant association with GMP practice of health care workers.

Regarding educational level of health care workers, first degree health care workers have positive association with GMP practice. This study revealed that the odds of GMP practice among first degree health care workers were two times higher as compared to the odds of GMP practice among certificate health care workers. Study from North Gondar Zone, Amhara Region, Ethiopia stated that first degree

health care workers had no significant association with GMP practice (17). The absence of association seen between first degree health care workers and GMP practice in the previous study might be due to the participant's background. Degree holder health care workers participant in the previous study might be direct university graduate who might not receiving in-service-training on GMP practice during the time when the researcher conducted the study.

Similarly, diploma health care workers have positive association with GMP practice. This study revealed that the odds of GMP practice among diploma health care workers were almost four times higher as compared to the odds of GMP practice among certificate health care workers. Study from North Gondar Zone, Amhara Region, Ethiopia reported that diploma health care workers has positive association with GMP practice (17). The possible explanation for the difference between first degree and diploma health care workers with certificate health care workers in terms of GMP practice might be their educational background. It is to mean, that being first degree and diploma holder health care workers might offer a first-hand chance to the professionals to have exposure for any training, including GMP practice and experience sharing conference which made them more aware about GMP service than those who had certificate to utilized available GMP equipment and GMP service.

The other factors that were positively associated with GMP practice of health care workers in this study were length of work experience. The odds of GMP practice among health care workers who had work experience ≥ 11 years were three times higher as compared to the odds of GMP practice among health care workers who had work experience 1–10 years. This result is in line with the study conducted in North Gonder Zone, Amhara region, Ethiopia (17). The possible explanation might be that long time they spent in GMP service practice might be account to their present performance. When experience is increased learning becomes more constructed as a result performance on GMP practice would become better.

In the present study availability of GMP equipment in the health institution was positively associated with health care workers GMP practice. The odds of GMP practice of the health care workers who have availability of GMP equipment in the health institution were almost three times higher as compared to the odds of GMP practice of the health care workers who did not have GMP equipment. This is similar with a study done in North Gonder Zone, Amhara Region, Ethiopia (17). The possible explanation might be that the existence of adequate equipment provides more chance of exposure to the health care workers to practice GMP than those who had no equipment in their health institution. This result was also supported by the result obtained from interview.

"...There is lack of GMP equipment and shelter to perform GMP. When we have everything at hand then everything works on GMP well." (A 30 years old rural health extension workers)

A positive association between health care workers with positive attitude and their GMP practice was also observed in this study. The odds of GMP practice among health care workers who had positive attitude towards GMP were four times higher as compared to the odds of GMP practice among health care workers who had negative attitude towards GMP. This was agreed with the finding gathered from interview.

“...GMP is a good and important tool, easy to use and effective. It is one of the services that we have to do to reduce child under nutrition. (A 32 years old urban health extension worker)

However, this finding is not in agreement the study carried out in North Gonder Zone, Amhara Region, Ethiopia which shown that a negative association between positive attitude of health care workers and their GMP practice (17). The possible justification for the result gained in this study might be the existing situation in the place where the health care workers have worked. It is to say that the factors like work load and job dissatisfaction less likely affect the health care workers attitude which in turn enables them to performance GMP practice as seen in the present study result.

Conversely, in this study a positive association was found between attending training on GMP and GMP practice of health care workers. The odds of GMP practice of the health care workers who have got training on GMP were five times higher as compared to the odds of GMP practice of the health care workers who did not get training on GMP. This result was also supported by the result obtained from interview.

“... Even if we have been trained, the training is not adequate. In-service training on growth monitoring and promotions service is important, if there are changes every time there is a different way of doing things, to keep up the standard and to update the procedures of GMP, training is important.” (A 29 years old rural health extension worker) .However, this result is in contrast with the study conducted in North Gonder Zone, Amhara Region, Ethiopia which showed that attending training on GMP has no significant association with GMP practice (17). The possible explanation for this varying result in this study might be the mode of delivery of GMP training might be appropriate, the topic of the training might be relating to GMP service, the training might be delivered by GMP experts all which made the health care workers perform GMP in better way.

The practical implication of this finding is that GMP practice clearly related to health care workers' educational level, work experience, training, positive attitude towards GMP and availability of GMP equipment. Health care workers who have first degree and diploma, higher work experience on GMP, training on GMP, positive attitude towards GMP are more likely to practice GMP. It will use as an input for national nutritional strategy, national nutritional program of Ethiopia and Thin on the Ground (Save the Children UK in Ethiopia) goal which were targeted to reduce malnutrition. In addition to this, it is an input for declarations that programmed to end up malnutrition problems which were planned by the government of Ethiopia such as Seqota declarations.

The strength of this study is that it is being quantitative method triangulated with qualitative method to supplement the results and also to explore factors that are not addressed by quantitative method. Limitation of the study should be noted and taken into consideration. Cross-sectional nature of this study did not reveal causal links between independent variables and child growth monitoring and promotion practice.

Conclusions

In conclusion, the overall proportion of good child growth monitoring and promotion (GMP) practice among health care workers in South Wollo Zone was 58.4% and this result is slightly higher as compared to the findings of some other previous studies in Ethiopia. Although most of the health care workers weighed the child weight, plotted it on growth chart and interpret the various growth curve patterns, 42.1% of health care workers did not give counseling to mothers/caregivers about their child growth that should be undertaken after interpreting growth curves of children. Qualification, work experience on GMP, training on GMP, availability of GMP equipment and attitude towards GMP were positively associated with GMP practice among health care workers and these factors should be considered during GMP service. Therefore, ministry of health should strengthen availability of GMP equipment, training on GMP, and bring positive attitude towards GMP using motivational strategies to improve GMP practice of health care workers with special focus on those with lower experience on GMP service. Health care workers should place more emphasis in adjusting and checking of weight scale, plotting and explaining of growth curve and age-appropriate child feeding counseling to mothers/caregivers based on the growth curve to improve child growth.

Declarations

Availability of data and materials

All data generated or analysed during this study are included in this published article (and its supplementary information files).

Competing interest

Authors declare that they have no competing interests.

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Authors' Contributions

GG: contributed to the study concept, study design and developed the proposal, worked in data collection, performed analysis, interpretation of the results, and prepared the manuscript. YA: assisted the design,

approved the proposal, provided technical support on every step of the analysis and revised the manuscript. KA assisted the design, approved the proposal, provided technical support on every step of the analysis and revised the manuscript. All authors read, reviewed, and approved the final manuscript for publication.

Ethics approval and consent to participate

The study was conducted in compliance with the principles of the declaration of Helsinki and it was approved by Ethical Review Committee of College of Medicine and Health Sciences, Wollo University with the reference number of 095/02/12 (S₁). Written informed consent to participate in the study was obtained from each participant.

Consent for publication

Written informed consent for publication was obtained from study participants.

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